



CONTROL DATA[®]
1784 COMPUTER SYSTEM

1729-3 CARD READER CONTROLLER
REFERENCE MANUAL

PRELIMINARY

[illegible]

OR USE COMMENT SHEET IN THE BACK OF THIS MANUAL.

PREFACE

This manual gives reference information for the CONTROL DATA® 1729-3 Card Reader subsystem which may be used in conjunction with the Data Channel of the 1784 Computer. For reference information on the 1784 Computer system and peripheral equipment which attach directly to the 1784 Computer see the 1784 Computer System Reference Manual, Publication No. 89633400.

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INTRODUCTION

The CONTROL DATA[®] 1729-3 Card Reader Subsystem consists of a reader mechanism and a controller.

The Controller consists of a single 50-PAK printed wiring board. It interfaces with the AQ channel of the 1784 Computer. The Controller receives and interprets function codes from this channel to initiate and control the reading of cards and to enable interrupts when specified conditions arise.

FUNCTIONAL DESCRIPTION

System Relationships

The controller interfaces the Card Reader with the 1784 Computer AQ data channel. Its typical configuration is shown in Figure 1. Data is transferred from the Card Reader to the lower 12 bits of the Computer A register (A00 through A11) containing the information for one column of a card (data bit A00 corresponds to card row 9).

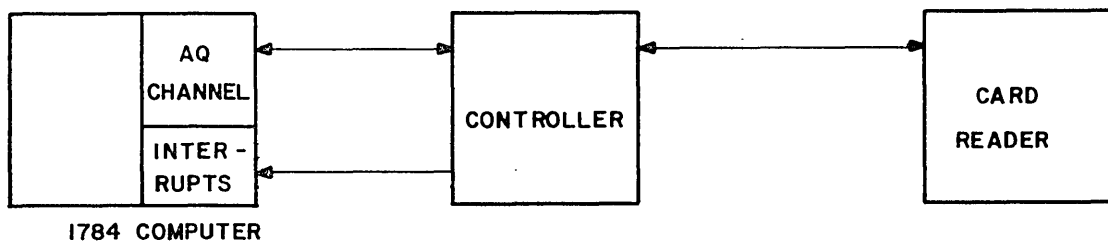


Figure 1. Typical Configuration

The controller may be accommodated in the 1784 Computer main enclosure or in the 1783-1 Expansion Enclosure.

The address of the Card Reader and controller is selected by inserting jumper plugs in positions Q7 through Q10 (Location 56) on the controller circuit card (Figure 2). The jumper plugs are stored on the circuit card in location 15.

Any of 16 different equipment codes may be set up by these plugs (see Table 1).

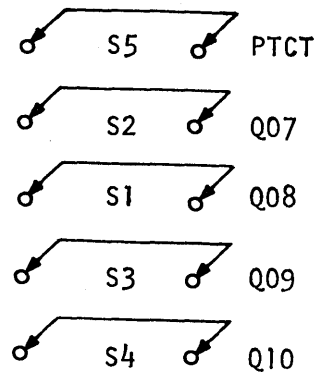


Figure 2. Equipment Select and Protect Bit Jumper Plugs

TABLE 1. HEXADECIMAL CODE FOR EQUIPMENT SELECTION CODE

Links		S4	S3	S1	S2
Hexadecimal Code	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
	8	1	0	0	0
	9	1	0	0	1
	A	1	0	1	0
	B	1	0	1	1
	C	1	1	0	0
	D	1	1	0	1
	E	1	1	1	0
	F	1	1	1	1

Note:

A '0' in the binary code indicates the presence of a jumper plug for the setting of the equipment code; a '1' its absence.

Interrupt

Four interrupt lines are available between the Controller and the Computer. They are designated:

Data, EOP, Alarm, Common
and defined under Director Status.

Protection

When the protect link (PTCT, Figure 2) on the Controller is set, the input-output instructions not having the protect bit set cause a protect violation and are rejected. Director Status requests are not rejected even if they cause protect violation.

PROGRAMMING

Table 2 and Figures 2 through 5 provide programming information. A description of the codes follows the figures.

TABLE 2. ADDRESSING CODES

DIRECTOR CODE	READ Signal	WRITE Signal
Q00 = 0, Q01 = 0	Data Transfer	---
Q00 = 0, Q01 = 1	---	Data Transfer
Q00 = 1, Q01 = 0	Director Status 1	---
Q00 = 1, Q01 = 1	Director Status 2	---

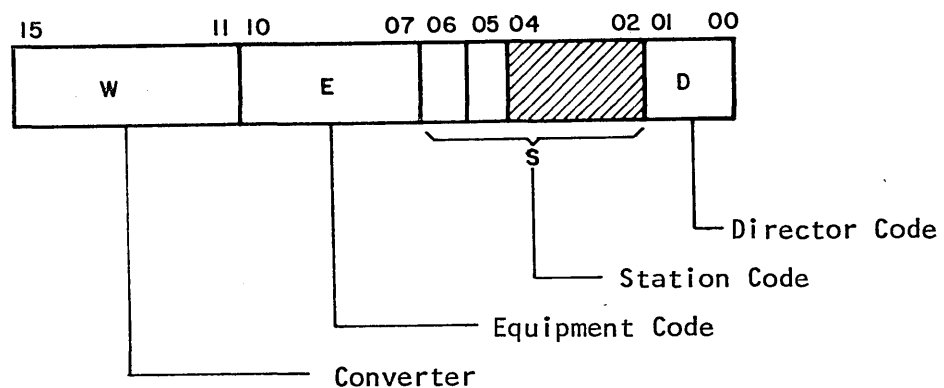


Figure 3. Q Register Format

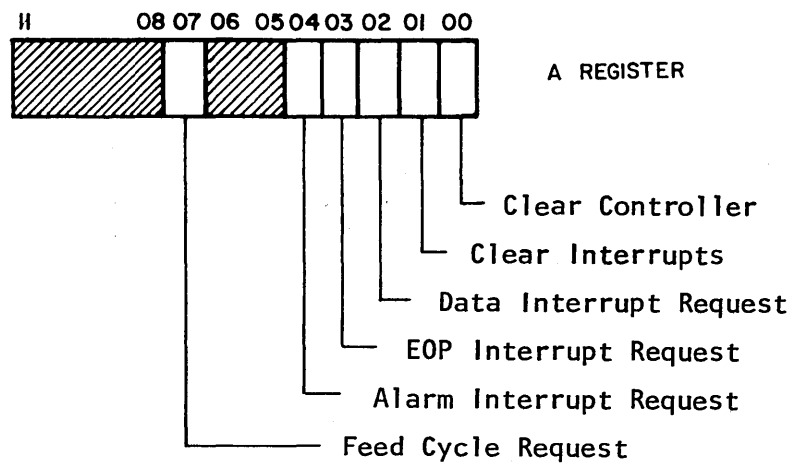


Figure 4. Function Code Format

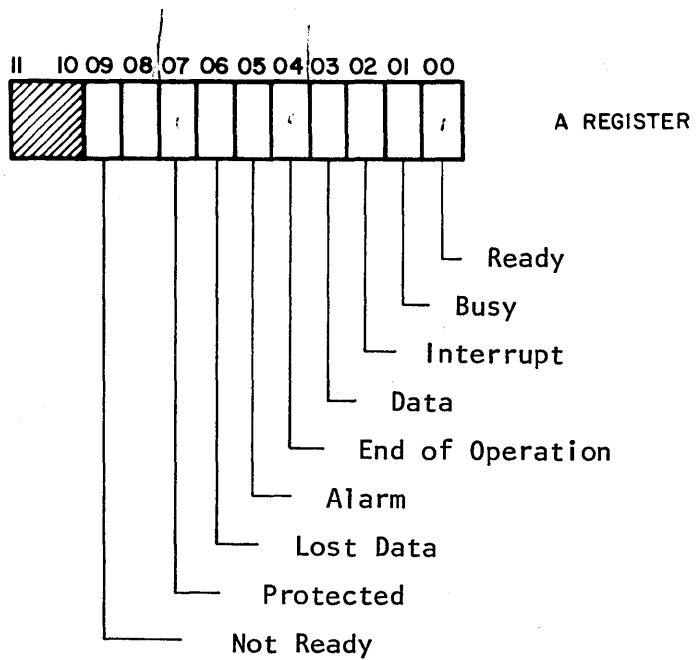


Figure 5. Status Code Format - Level 1

CODES

Converter	The W portion of the Q register (Q11 - Q15) must be all 0's for all Card Reader operations.
Equipment	The E portion of the Q register (Q07 - Q10) defines the Card Reader equipment code. The code is set up by the plugs shown in Figure 2. If the switch settings match bits 07 - 10 of Q, the equipment responds.
Station	The S-part of the Q register (Q05, Q06) must have the following settings for Director Functions and for Data transfer: Q05 = 1, Q06 = 0.
Command	When accompanied by an equipment code and either a Read or Write signal, a command code defines the operation to be performed. The D portion of Q (Q00 and Q01) define the operation to be performed by the Controller.

DATA TRANSFER

Read Data (Q00 = 0, Q01 = 0, Q05 = 1, Q06 = 0)

When bits Q00, Q01 and Q06 are 0, and Q05 = 1, and they are accompanied by the Equipment Code and a Read signal, the Controller is directed to perform a data transfer. A reject occurs if there is no data to be transferred. The Card Reader rejects when

- a. The Card Reader is not ready
- b. The computer attempts to input data at a rate that exceeds the capabilities of the Card Reader, that is, Data Status is not set.
- c. Protect Violation occurred.

DIRECTOR FUNCTIONS (Q00 = 1, Q01 = 0, Q05 = 1, Q06 = 0)

When Q00 and Q05 are 1's and Q01 and Q06 are 0's and they are accompanied by an equipment code and a Write signal, Controller is directed to perform the following operations. Director functions may be stacked (i.e. two or more functions sent simultaneously), but when a function is sent which should be rejected, the Controller rejects the Director function.

NOTE

The Card Reader executes and replies to the Clear function if it is Not Ready, provided that no other director bit (except A01) is transmitted with it (bits A02 through A08 must be zero). Care should be taken in using this function while the Card Reader is busy, as this condition results in the operation being aborted.

Clear Controller (A00 = 1)

This function directs the clearing of all interrupt requests and responses, motion requests, errors, and other logic which may be cleared. This bit is subordinate to bits A02 through A07 of the Director Function.

NOTE

The Card Reader will execute and reply to the Clear Interrupts function if it is Not Ready, provided that no other director bit (except A00) is transmitted with it (bits A02 through A08 must be zero).

Clear Interrupts (A01 = 1)

This function directs that all interrupt requests and their responses be cleared; it is subordinate to the interrupt request bits A02 through A04.

Data Interrupt Request (A02 = 1)

This function sets the Data Interrupt Request flag which causes an interrupt to be generated when information is available. The interrupt is cleared by a reply to data transfer. The interrupt request and response is cleared by bit A00 and A01. Interrupt Request takes precedence over function clears.

End of Operation Interrupt Request (A03 = 1)

This function sets the EOP Interrupt Request flag. The purpose of this interrupt is to notify the computer that the unit is finished with an operation. The Interrupt Request and Response is cleared by bit A00 or A01. Interrupt Request takes precedence over function clears.

The interrupt may be selected before or during the operation. An interrupt response does not occur for an operation which terminated before the selection was made.

Alarm Interrupt Request (A04 = 1)

This function sets the Alarm interrupt request flag and so enables the generation of an interrupt when an Alarm condition exists. These conditions are listed in the Alarm section. An Alarm condition that exists at the time of the interrupt request immediately provides a response; if the Alarm condition does not exist at the time of the interrupt request the interrupt response is provided as soon as the Alarm condition is detected.

The Alarm Interrupt Request function is cleared by a Master Clear or when A00 = 1, or A01 = 1 with A04 = 0.

The interrupt response is cleared by a Master Clear or when A00 = 1 or A01 = 1. When the interrupt response is cleared by Director Function A00 = 1, or A01 = 1, the interrupt request may be reset with the same operation if A04 = 1.

Director functions A05 and A06 are not used.

Feed Request (A07 = 1)

This function directs the Card Reader to initiate a feed cycle.

If a new Feed Request is issued before EOP occurred, data transfer in that card is truncated and will continue on the next card being fed. No EOP interrupt is generated. This function takes precedence over the clear controlled function.

Director Function A08 is not used; it is accepted by the Controller.

Director Function A09 through A15 are not used, and are ignored by the Controller.

DIRECTOR STATUS (Q00 = 1, Q01 = 0) LEVEL 1

When Q00 is a 1 and Q01 is a 0, and a Read signal is present, the computer is requesting Level 1 status. The Controller will always reply to this operation.

Ready (A00 = 1)

This bit indicates that the Ready signal is active on Card Reader 1792-3.

Busy (A01 = 1)

This bit indicates that the Card Reader is busy. The Card Reader becomes busy when a feed cycle is initiated and remains busy until an End of Operation occurs.

Interrupt (A02 = 1)

This bit indicates that an interrupt response was generated by the controller. The other status bits must be monitored to determine the cause of the interrupt. The controller may generate interrupts on four different lines due to three different conditions which may occur at the controller and their logical "OR" function.

a. Data Interrupt

Data Interrupt will be generated when both the Data Interrupt Request flag and the Data Status are active.

b. EOP Interrupt

EOP Interrupt will be generated when both the EOP Interrupt Request flag and the EOP status are active.

c. Alarm Interrupt

Alarm Interrupt will be generated when both the Alarm Interrupt Request flag and the Alarm status are active.

d. Common Interrupt

Common Interrupt will be generated when any or any combination of the Data Interrupt, the EOP Interrupt or the Alarm Interrupt are generated.

Data (A03 = 1)

This bit indicates that a data transfer may occur, that is data is available in the controller ready for transfer to the computer. The status and interrupt drops when data has been transferred to the computer.

End of Operation (EOP) (A04 = 1)

This bit indicates that the Card Reader has completed reading a Card.

Alarm (A05 = 1)

This bit indicates the presence of an alarm. Two kinds of alarm condition can occur:

- a. The Card Reader Ready signal becomes not active. Ready status becomes false.
- b. When Lost Data occurs, no further transfers occur from that card. The Ready status is unchanged.

Lost Data (A06 = 1)

This bit indicates that data was not transferred out of the Controller to the computer, before the next column of a card being read appeared. No further data transfer will occur until Clear Controller is issued.

Protected (A07 = 1)

This bit indicates that the Controller is in the Protect state, that is the Protect jumper plug is in the Protect position. The Controller then accepts only those instructions which have their protect bit set. All other instructions are rejected. A protected instruction can be used with either a protected or an unprotected Card Reader. For setting the protect bit see Operation.

Director status is not rejected if Protect Violation occurred.

Director status bit A08 is not used and is always zero.

Not Ready (A09 = 1)

This bit indicates that sometime during a card cycle there was a failure in the transport of the card. It is always the inverse of Ready (bit 00).

Director status bits A10 through A15 are not used and are always 0.

DIRECTOR STATUS (Q00 = 1, Q01 = 1), LEVEL 2

The Controller will always accept Director Status, level 2, but will load the A-register with the constant 0000₁₆.

OPERATION

Prepare the Controller for operation as follows:

- a. Set the Equipment Code as required according to Table 1 by inserting the appropriate jumper plugs in position (Figure 2).
- b. Set the Protect Bit as required by inserting the protect bit jumper plug (PTCT) in position (Figure 2).
- c. Connect the device cable to the appropriate connector on the rear panel of the 1784 Computer.
- d. Insert the Controller card in its place according to the system configuration.

COMMENT SHEET

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